

**DERMESTES RATTUS (COLEOPTERA:
DERMESTIDAE): TAXONOMIC STATUS AND
COMPARISON WITH FIVE CLOSELY RELATED
SPECIES IN THE WESTERN UNITED STATES¹**

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ABSTRACT: *Dermestes tristis*, ranging from central California into Baja California Norte, Mexico, is determined to be a geographical variant and subspecies (New Status) of *D. rattus* occurring from northern California to British Columbia and east to Wyoming. These two forms are distinguished from five closely related species including the European *D. sardous*. The latter species is apparently established in southern California.

Through the kindness of William H. Clark I have been privileged to study a number of specimens of *Dermestes rattus* LeConte taken in ethylene glycol pitfall traps (Clark and Blom, 1992), particularly a series of 42 specimens collected by him and Thomas A. Bickel over the summer and fall of 1986 in the Almaden Mine area of Washington County, Idaho (Bickel *et al.*, 1987). This series, quite evidently consisting of a single species, clarified a nagging question of what and how many species might be involved in the *D. caninus-rattus* complex. Mr. Clark also provided for my study a number of specimens which he and associates collected in ethylene glycol pitfall traps (Clark and Blom, 1992) over several years in various localities in Baja California Norte. Voucher specimens of the Idaho and Baja California material are deposited in the Orma J. Smith Museum of Natural History (CIDA), Albertson College of Idaho, Caldwell.

D. rattus is characterized by (1) the pronotum with intermingled white and golden brown to golden hairs and 3 small patches of all white hairs in a transverse line at the middle and (2) the elytra covered with whitish hairs except for small, irregularly dispersed patches of black hairs. *D. tristis* is the name given by Fall to a form with similar pronotal hairs but with the elytra covered with black hairs except for a few scattered whitish hairs.

The last full revision of the genus *Dermestes* was by P. Lepesme (1946). His revision did not consider *D. tristis*, since specimens of this form were unavailable to him. Hatch (1962) in his study of beetles of the Pacific Northwest recognized *D. rattus* and *D. tristis* as distinct species. He did not distinguish these two species from the closely related *D. caninus*, since it is not known to occur in that area.

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What now seems clear is that *D. tristis* is at best a geographic variant of *D. rattus*, a species quite variable with respect to the type and pattern of setae on the elytra. In the series from Idaho are typical *D. rattus* specimens in which the elytra are covered with whitish setae except for a few small patches of dark hairs. Also included are specimens with variable percentages of whitish hairs, and one specimen with all dark hairs. On some the whitish hairs are fine and on others relatively and noticeably coarser. The dark setae vary from dark brown to black. The all dark and nearly all dark specimens in the series are identical to the forms described as *D. tristis*.

Past difficulty in recognizing the status of these forms no doubt came from the lack of collection of series from any one locality, even though specimens are not uncommon in collections. Out of 62 collections of "tristis" that I have recorded over the past 35 years, most number no more than one or two specimens, the longest series consisting of 7 and one other series of 5 specimens. Of 67 records of "rattus," with one exception, the collections were mostly of single specimens with a few small series, the largest numbering 5 specimens. The exception consists of 36 specimens collected various dates during 1983 in Kemmerer, Lincoln County, Wyoming, by R. R. Parmenter.

The series from Lincoln County, Wyoming, consists entirely of specimens of the "rattus" type. The collections from Baja California Norte are wholly "tristis". "Rattus" type specimens predominate in the series from Washington County, Idaho. I predict that any future long series collected between Idaho and Mexico will include increasing percentages of "tristis" forms southward. "Tristis" forms are much more frequent in collections that have been made in southern California.

In view of the available evidence, I propose that subspecific names be assigned these two forms with a somewhat arbitrary geographic division line as indicated.

Dermestes rattus rattus Le Conte (1854)

From the level of Mendocino and Colusa counties, California, northward to central British Columbia, Alberta, and Montana, south to Colorado and Utah.

The species does not appear to occur in Arizona, New Mexico, Texas, Kansas, or states farther east. Specimens that I previously determined as *D. rattus* from more eastern localities need to be reexamined. I think they will prove to be varieties of *D. caninus*.

***Dermestes rattus tristis* Fall (1897) subspecies, NEW STATUS**

Synonym: *Dermestes medialis* Casey (Beal and Seeno, 1977)

Sonoma, Napa, and Yolo counties, California, south into Baja California Norte. This would include the San Francisco Bay area population of *tristis* noted by Beal and Seeno.

A Mediterranean species not previously recorded from the United States is apparently established in a small part of the range of *D. rattus tristis* and might be confused with it. *D. sardous* Küster (1846) (see Lepesme, 1946) was collected in California at Santee, San Diego County, (1 specimen, 12-ii-67, J. B. Heppner, blacklight) and at Point Loma, San Diego (3 specimens, 16-iv-79, 1 specimen 29-v-79, R. Baranowski). A voucher specimen of this species is deposited in the California Academy of Sciences.

The following key is provided to distinguish the 2 species above and 4 other closely related species found in North America north of Mexico and west of the Great Plains. The tricolorous hairs on the disc of the pronotum readily separate the 6 species from other species of *Dermestes* found in the same region. The 6 belong to the subgenus *Dermestinus* Zhantiev (1967). In this region there are 2 other species in the same subgenus (*D. maculatus* DeGeer and *D. frischi* Kugelarm). These are further distinguished from *D. rattus* and its congeners by having a tuft of long hairs at the middle of abdominal sternum 4 only, rather than at the middle of both abdominal sterna 3 and 4. (*D. carnivorus* Fabricius with tufts on both sterna 3 and 4 is not known to be established in this part of the U.S.)

1. Elytra with subbasal band of whitish hair; portion of elytra posterior to band with small intermingled patches of golden, whitish, and black hair; dark spots on sides of abdominal sterna consisting of intermingled black and golden brown hairs. Species large, usually longer than 9 mm.....*D. marmoratus* Say
- Elytra with or without subbasal band of whitish hair but if with subbasal band of whitish hair then without small intermingled patches of golden, whitish, and black hair on posterior 1/2; dark spots on sides of abdominal sterna consisting of black hairs only. Smaller species, almost always shorter than 7 mm.
2. Elytra with black hairs and small patches of whitish hair throughout, these usually intermingled with small patches of golden hair, but golden patches may rarely be limited to basal 1/4; pronotum with small, irregular patches of black, golden, and whitish hair; hairs on either side of midline at base of pronotum diverging from midline about 30 degrees.....*D. talpinus* Mannerheim
- Elytra with black hairs and bands or patches of whitish hair or band of golden hair but without small patches of whitish hair throughout (if irregular subbasal band of golden hair present, whitish hairs may be intermingled with black hairs; if whitish patches present, a few golden hairs may be present along basal margin); hairs of pronotum at midline more or less parallel, rarely diverging as much as 10 degrees from midline.....3

3. Elytra with whitish hairs forming broad subbasal band about 2 times length of scutellum, this band separated from base by band of black hair or black hairs intermingled with few golden or whitish hairs; elytra with small intermingled patches of whitish and black hair posterior to subbasal band*D. fasciatus* LeConte
- Elytra with black and golden hairs only, or with whitish hairs covering most of elytra, or whitish hairs forming band or patches, but then band or patches of whitish hair extending to base of pronotum.....4
4. Elytron with black hairs and intermingled whitish hairs and golden hairs forming a narrow, irregular triangle at about basal 1/4; pronotum with black hairs, transverse line of patches of golden hair across middle of disc, and other variable patches of golden hair.....*D. sardous* Kuster
- Elytron with all black hairs, all whitish hairs except for few patches of black hair at apex, or band and patches of whitish hair but without golden hairs except at times for very few along basal margin; pronotum with intermingled patches of golden and black hair and 3 patches of white hair set transversely across disc5
5. Abdominal sternum 1 with dark lateral area extending not more than 2/3 distance toward posterior margin and separated from margin by region of all white hair; abdominal sterna 2-4 covered with all white hairs except for subcircular area of black hairs at lateral anterior corners of sterna.....*D. caninus* Germar
- Abdominal sternum 1 with dark lateral area extending to posterior margin of segment and consisting of all blackish hairs or with some intermingled golden brown and white hairs; sterna 3-4 covered with intermingled golden brown and whitish hairs except for subcircular area of black hairs at lateral anterior corners of sterna..*D. rattus* subspecies

I submit the following detailed diagnoses of the last 3 species in the key, which are easily confused with each other because of the range of variation in each. The diagnoses depend in large part on setal characters which, unfortunately, are often lost in old or mishandled specimens.

Dermestes sardous Kuster

(1) Pronotum covered with intermingled black and white hairs with pronounced band or patches of golden hair along anterior margin, transverse band of patches of golden hair at middle, and golden patch on each side at basal 1/4 and lateral 1/2. (Lepesme, 1946, describes the primary pubescence as consisting of black and grey-blue hairs, but our specimens have white rather than grey-blue hairs.) (2) Elytron covered with intermingled black and whitish hairs; basal margin with patch of golden hair on humerus and patch of golden hair at about lateral 1/2 of base; basal 1/4 of elytron with somewhat elongate, irregularly triangular, submedian patch of golden hair. (Lepesme does not mention the golden hairs at the basal 1/3 in his description of the species but describes the variety *striatellus* Reitter which has longitudinal lines of yellowish hairs.) (3) Posterior margin of metasternal epimeron transverse (as in *D. rattus*). (4) Dark area on side of abdominal sternum 1 extending about 2/3 distance toward posterior margin and separated from margin by covering of all white hair. (5) Abdominal sterna 1-4 with covering of all white hair except for large lateral dark area on sternum 1 and for subcircular patches of black hair at lateral anterior corners of sterna 2-4; sternum 5 covered with black hair except for 2 small sublateral patches of white hair at anterior margin. (6) Male with dense brush of fine, golden-white hair on underside of front tarsomeres 1-3 and to some extent under tarsomere 4.

Dermestis caninus Germar

(1) Pronotum with patches of golden and black hair and 3 small patches of whitish hair in transverse line across middle of disc (as in *D. rattus*). (2) Elytron with irregular, large patches of whitish hair limited to anterior 1/4, except for some small scattered patches on posterior 3/4, varying to elytron with whitish hairs covering most of anterior 3/4 with irregular patches of whitish and black hair on posterior 1/4; 2 dark areas of variable size always present at or close to basal margin, but whitish band or patches also attaining basal margin. (3) Lateral posterior angle of metasternal epimeron forming acute angle and extending further posteriad than inner angle. (4) Dark area at lateral margin of abdominal sternum 1 extending not more than 2/3 distance from base to posterior margin and separated from margin by covering of all white hair. (5) Abdominal sterna 1-4 with covering of all white hair except as described above for sternum 1 and except for small subcircular patches of all black hair at lateral anterior corners of sterna 2-4; sternum 5 with white hairs along basal margin, these usually forming 2 sublateral patches extending about 2/3 distance toward posterior margin. (6) Male with dense brush of fine, golden-white hair on underside of front tarsomeres 1-3 and to some extent under tarsomere 4.

Dermestes rattus subspecies

(1) Pronotum with patches of black and golden hair and 3 small patches of all-white hair in transverse line across the middle of the disc. (2) Elytron with nearly all white hairs with small, irregular patches of black or dark brown hair (*D. rattus rattus*) to all black or dark brown hairs or all dark hairs except for few intermingled white or golden white hairs (*D. rattus tristis*). (3) Posterior margin of metasternal epimeron transverse, lateral posterior angle not acute, not extending further posteriad than inner angle. (4) Abdominal sternum 1 with lateral dark area extending to posterior margin of segment, this area consisting of all blackish hair or with some intermingled golden brown and white hairs but without being separated from posterior margin by solid band of white hair; (5) Abdominal sterna 1-2, except for lateral dark areas, covered mostly with white hair; sterna 3-5 covered with intermingled golden brown and white hairs. Some small patches of white hair may be present, but 1/3 or more of the hairs are golden brown. (6) Male without a dense brush of fine hair on underside of anterior tarsomeres 1-3; setae of anterior tarsomeres similar to those of middle and hind tarsomeres.

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